

10

present invention is applied to the electronic still camera, the present invention is not limited to the electronic still camera, but, for example, the invention can also be applied to a case in which a VTR is provided with an electronic shutter function for still photography.

As has been described heretofore, because the present invention is constructed such that, during the sequential photographing operation, the updating of the color temperature data to be used for the white balance adjustment is prohibited, according to the invention, the homogeneity of the main object can be maintained free from the variations of the color temperature of the field when photographing still images in the sequential photographic mode.

Also, due to the fact that in the present invention the response time, which extends from the detection of the field color temperature by the color temperature detection device to the execution of the white balance adjustment by the control device, can be altered, according to the invention, and the white balance can be adjusted properly according to the photographic modes.

It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the invention is to cover all modifications alternate constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. A white balance adjusting device for use in a camera having at least a single photographic mode in which, when a shutter release operation is performed, an image of a field is picked up by a single frame and a video signal representing the still image thereof is formed and a sequential photographic mode in which, while said shutter release operation is being performed, the images of said field are picked up sequentially for every predetermined period of time and video signals respectively representing the still images thereof are formed, said white balance adjusting device comprising:
 - single/sequential photographic mode setting mode setting means for setting said single photographic mode and said sequential photographic mode;
 - operation means for performing said shutter release operation;
 - color temperature detecting means for detecting a color temperature of said field and outputting a color temperature signal representing said color temperature; and
 - control means for adjusting a white balance of said video signal in response to color temperature data that is obtained from said color temperature signal, said control means receiving a set output from said single/sequential photographic mode setting means and an output signal from said operation means and prohibiting said color temperature data that is used for adjusting said white balance from being updated when a sequential photographic operation is being performed.
2. A white balance adjusting device for use in a camera as set forth in claim 1, wherein said color temperature detecting means comprises:
 - a color temperature detection element for outputting a first photocurrent signal corresponding to an R component of an incident light from said field and a second photocurrent signal corresponding to a B component of said incident light;
 - a logarithmic conversion circuit for receiving a detection output from said color temperature detec-

11

tion element, compressing said detection output logarithmically and outputting an R signal and a B signal respectively corresponding to said R and B components of said incident light;
a subtraction circuit for calculating a difference between said R and B signals output from said logarithmic conversion circuit; and
an amplifier for amplifying a subtraction output signal from said subtraction circuit up to a predetermined level.

3. A white balance adjusting device for use in a camera as set forth in claim 2, wherein said color temperature detection element comprises a first photo diode for receiving only said R component of said incident light from said field and a second photo diode for receiving only said B component of said incident light, wherein said first and second photo diodes are connected in series to each other in such a manner that the respective cathodes thereof are directly connected to each other for allowing said first and second photo diodes to have mutually opposite polarities.

4. (Amended)

1 A white balance adjusting device for use in a camera in which a field
2 is photographed and a video signal representing said field is formed, said
3 device comprising:

4 photographic mode setting means for setting a still mode for
5 photographing said field as a still image and a movie mode for
6 photographing said field as a moving image;

7 color temperature detecting means for detecting a color temperature of
8 said field and outputting a color temperature signal representing said color
9 temperature; and

10 control means for adjusting a white balance of said video signal in
11 response to color temperature data that is obtained from said color
12 temperature signal, said control means receiving a set output from said
13 photographic mode setting means and adjusting said white balance of said
14 video signal at a shorter cycle as compared with said movie mode when said
15 camera is set in said still mode;

16 wherein when the still mode is set by the photographic mode setting
17 means, the control means obtains the color temperature signal used for the
18 white balance adjustment so that a first response time length between the
19 detection of the color temperature by the color temperature detecting means
20 and the white balance adjustment for the image signal of the still image is at
21 most a predetermined time length;

22 wherein when the movie mode is set by the mode setting means, the
23 control means obtains the color temperature signal from the color
24 temperature detecting means so as to adjust the white balance of the image

25 signal composing the moving image if the color temperature of the field
26 varies while the photographing of the moving image is continuously
27 performed in the movie mode, and the control means obtains the color
28 temperature signal used for the white balance adjustment so that a second
29 response time length between the detection of the color temperature by the
30 color temperature detecting means and the white balance adjustment for the
31 image signal of each of frames composing the moving image is longer than
32 the predetermined time length and is longer than a photographing cycle of
33 the frames composing the moving image.

5. A white balance adjusting device for use in a camera as set forth in claim 4, wherein said color temperature detecting means comprises;

a color temperature detection element for outputting a first photocurrent signal corresponding to an R component of an incident light from said field and a second photo current signal corresponding to a B component of said incident light;

a logarithmic conversion circuit for receiving a detection output from said color temperature detection element, compressing said detection output logarithmically and outputting an R signal and a B signal respectively corresponding to said R and B components of said incident light;

a subtraction circuit for calculating a difference between said R and B signals output from said logarithmic conversion circuit; and

an amplifier for amplifying a subtraction output signal of said subtraction circuit up to a predetermined level.

6. A white balance adjusting device for use in a camera as set forth in claim 5, wherein said color temperature detection element comprises a first photo diode for receiving only said R component of said incident light from said field and a second photo diode for receiving only said B component of said incident light, wherein said first and second photo diodes are connected in series to each other in such a manner that the respective cathodes thereof are directly connected to each other for allowing said first and second photo diodes to have mutually opposite polarities.

✱ ✱ ✱ ✱ ✱

1 7. The white balance adjusting device for use in the camera as
2 defined in claim 4, wherein:

3 the color temperature detecting means sequentially detects color
4 temperatures of the field at a predetermined cycle and sequentially outputs
5 first color temperature signals representing the detected color temperatures;
6 and

7 when the movie mode is set by the mode setting means, the control
8 means sequentially compares each of the first color temperature signals
9 sequentially outputted from the color temperature detecting means with a
10 second color temperature signal currently used for the white balance
11 adjustment, and if color temperature change conditions in which a
12 difference between the each of the first color temperature signals and the
13 second color temperature signal is at least a constant value occur a first
14 number of times, then the control means obtains a latest first color
15 temperature signal and updates the second color temperature signal used
16 for the white balance adjustment by the latest first color temperature signal.

1 8. The white balance adjusting device for use in the camera as
2 defined in claim 7, wherein when the movie mode is set by the mode setting
3 means, the control means sequentially compares each of the first color
4 temperature signals sequentially outputted from the color temperature
5 detecting means with the second color temperature signal currently used for
6 the white balance adjustment, and if color temperature changing conditions
7 in which symbols of the differences between the first color temperature
8 signals and the second color temperature signal are the same and absolute
9 values of the differences are at least the constant value occur sequentially
10 the first number of times, then the control means obtains the latest first
11 color temperature signal and updates the second color temperature signal
12 used for the white balance adjustment by the latest first color temperature
13 signal.

1 9. The white balance adjusting device for use in the camera as
2 defined in claim 4, wherein when the still mode is set by the mode setting
3 means, the control means compares a first color temperature signal
4 outputted from the color temperature detecting means with a second color
5 temperature signal currently used for the white balance adjustment, and if a
6 color temperature change condition in which a difference between the first
7 color temperature signal and the second color temperature signal is at least
8 a constant value occurs, then the control means obtains a latest first color
9 temperature signal and updates the second color temperature signal used
10 for the white balance adjustment by the latest first color temperature signal.

1 10. The white balance adjusting device for use in the camera as
2 defined in claim 7, wherein when the still mode is set by the mode setting
3 means, the control means sequentially compares each of the first color
4 temperature signals sequentially outputted from the color temperature
5 detecting means with the second color temperature signal currently used for
6 the white balance adjustment, and if color temperature change conditions in
7 which a difference between the each of the first color temperature signals
8 and the second color temperature signal is at least a constant value occur a
9 second number of times, the second number being less than the first
10 number, then the control means obtains a latest first color temperature
11 signal and updates the second color temperature signal used for the white
12 balance adjustment by the latest first color temperature signal.

1 11. The white balance adjusting device for use in the camera as
2 defined in claim 8, wherein when the still mode is set by the mode setting
3 means, the control means sequentially compares each of the first color
4 temperature signals sequentially outputted from the color temperature
5 detecting means with the second color temperature signal currently used for
6 the white balance adjustment, and if color temperature changing conditions
7 in which symbols of the difference between the first color temperature signal
8 and the second color temperature signal are the same and absolute values
9 of the differences between the first color temperature signal and second
10 color temperature signal are at least the constant value occur sequentially a
11 second number of times, the second number being less than the first
12 number, then the control means obtains the latest first color temperature

13 signal and updates the second color temperature signal used for the white
14 balance adjustment by the latest first color temperature signal.

1 12. The white balance adjusting device for use in the camera as
2 defined in claim 4, wherein:

3 the color temperature detected means sequentially detects color
4 temperatures of the field at a predetermined cycle and sequentially outputs
5 color temperature signals representing the detected color temperatures; and

6 the white balance adjusting device further comprises a low-pass filter
7 to which the color temperature signals sequentially outputted from the color
8 temperature detecting means are added, the low-pass filter having a time
9 constant larger than the predetermined cycle; and

10 the control means obtains the color temperature signals via the low-
11 pass filter when the movie mode is set by the mode setting means.

1 13. The white balance adjusting device for use in the camera as
2 defined in claim 12, wherein when the still mode is set by the mode setting
3 means, the control means changes the time constant of the low-pass filter to
4 be smaller.

1 14. The white balance adjusting device for use in the camera as
2 defined in claim 4, wherein:

3 the still mode which is set by the mode setting means includes a
4 single mode for photographing the field by a single frame and a sequential
5 mode for sequentially photographing the field at constant intervals; and

1

[illegible]